

CLAIMS

What is claimed is:

1. A method for determining photoresist thickness comprising:
5 forming a layer of material over a semiconductor wafer;
forming a layer of photoresist having varying thickness over said layer
of material;
measuring thickness of said layer of photoresist at a plurality of points;
exposing portions of said layer of photoresist to light;
10 developing said layer of photoresist;
performing an etch so as to form features in said layer of material, said
etch removing portions of said layer of photoresist so as to form photoresist
structures; and
analyzing said photoresist structures to determine photoresist
15 thickness.
2. A method as recited in Claim 1 wherein said layer of photoresist is
formed by depositing photoresist over said semiconductor wafer while said
semiconductor wafer is spinning in a resist coating unit and while said
20 semiconductor wafer has a temperature that is greater than an internal
temperature of said resist coating unit.
3. A method as recited in Claim 1 wherein said forming a layer of material
further comprises forming a plurality of layers of material over a

semiconductor wafer, said performing an etch removing portions of each of said layers of material.

4. A method as recited in Claim 1 wherein said analyzing said photoresist
5 structures further comprises determining the thickness of the thinnest
photoresist structure that includes a shoulder.

5. A method as recited in Claim 1 wherein said determined thickness
comprises said determined thickness of the thinnest photoresist structure that
10 includes a shoulder plus a process variation value.

6. A method as recited in Claim 1 wherein said analyzing said photoresist
structures to determine photoresist thickness further comprises:
generating an image of said photoresist structures; and
15 analyzing said image to determine photoresist thickness.

7. A method as recited in Claim 6 wherein said generating an image
further comprises:
severing said semiconductor wafer; and
20 generating an image of said severed semiconductor wafer.

8. In a semiconductor fabrication process in which a patterned layer is
etched using a first etch process, a method for determining photoresist
thickness to be used to form said patterned layer, said method comprising:

forming a layer of material over a semiconductor wafer, said layer of material having one or more common characteristic relative said patterned layer;

forming a layer of photoresist having varying thickness over said layer
5 of material;

measuring thickness of said layer of photoresist at a plurality of points;

exposing portions of said layer of photoresist to light;

developing said layer of photoresist;

performing an etch using a second etch process so as to form features
10 in said layer of material, said etch removing portions of said layer of photoresist so as to form photoresist structures; and

analyzing said photoresist structures to determine photoresist thickness.

15 9. A method as recited in Claim 8 wherein said common characteristic comprises composition.

10. A method as recited in Claim 8 wherein said common characteristic comprises width.

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11. A method as recited in Claim 8 wherein said forming a layer of material further comprises forming a plurality of layers of material having one or more common characteristic relative said patterned layer, said performing an etch removing portions of each of said layers of material.

12. A method as recited in Claim 8 wherein said etch uses the same type of etch process that is used in said semiconductor fabrication process to etch said patterned layer.

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13. A method as recited in Claim 11 wherein said first etch process uses approximately the same etch chemistry as said first etch process.

14. A method as recited in Claim 8 wherein said analyzing said photoresist structures to determine photoresist thickness further comprises:
generating an image of said photoresist structures; and
analyzing said image to determine photoresist thickness.

15. A method as recited in Claim 13 wherein said generating an image further comprises:
severing said semiconductor wafer; and
generating an image of said severed semiconductor wafer.

16. A patterned layer formed in accordance with the method of Claim 8.

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17. A method for forming a patterned layer comprising:
forming a first layer of material over a first semiconductor wafer;
forming a first layer of photoresist over said first layer of material, said first layer of photoresist having varying thickness;

measuring thickness of said first layer of photoresist at a plurality of points;

exposing portions of said first layer of photoresist to light;

developing said first layer of photoresist;

5 performing a first etch so as to form features in said first layer of material, said etch removing portions of said first layer of photoresist so as to form photoresist structures that overly said features;

analyzing said photoresist structures to determine photoresist thickness;

10 forming a second layer of material over a second semiconductor wafer, said second layer of material composed of the same material as said first layer of material;

forming a second layer of photoresist over said second layer, said second layer of photoresist having a thickness that is approximately equal to

15 said determined photoresist thickness; and

performing a second etch, said second etch removing portions of said second layer of material so as to form a patterned layer.

18. A method as recited in Claim 17 wherein said first etch uses the same
20 etch chemistry that is used in said first etch.

19. A method as recited in Claim 18 wherein second layer of material has approximately the same thickness as said first layer of material.

20. A patterned layer formed in accordance with the method of Claim 17.

21. A method for determining photoresist thickness comprising:

forming a layer of material over a first semiconductor wafer;

5 forming a layer of photoresist having varying thickness over said layer of material and forming a layer of photoresist having varying thickness over a second semiconductor wafer;

measuring thickness of said layer of photoresist formed on said second semiconductor wafer at a plurality of points;

10 exposing portions of said layer of photoresist formed on said first semiconductor wafer to light;

developing said layer of photoresist formed on said first semiconductor wafer;

15 performing an etch so as to form features in said layer of material, said etch removing portions of said layer of photoresist formed on said first semiconductor wafer so as to form photoresist structures; and

analyzing said photoresist structures to determine photoresist thickness.